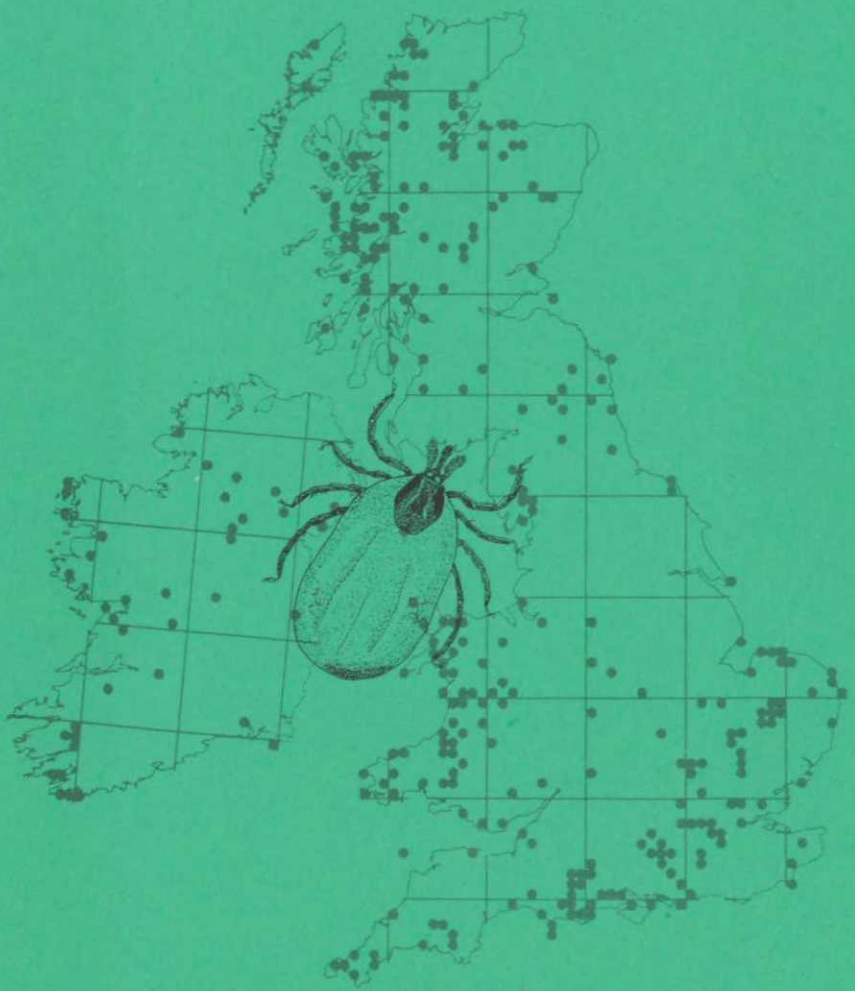
PROVISIONAL ATLAS OF THE TICKS (IXODOIDEA) OF THE BRITISH ISLES

K P MARTYN



BIOLOGICAL RECORDS CENTRE

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The **Biological Records Centre** is operated by **ITE,** and receives financial support from the **Nature Conservancy Council.** It seeks to help naturalists and research biologists to co-ordinate their efforts in studying the occurrence of plants and animals in the British Isles, and to make the results of these studies available to others.

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Natural
Environment
Research
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By

K P MARTYN

(BRITISH MUSEUM (NATURAL HISTORY))

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Institute of Terrestrial Ecology
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Huntingdon

1988

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FOREWORD

Anyone who has lived in the country, especially as a child, and who has walked through grassy pastures or heather moorland in summer, will probably have encountered at least one tick. Once discovered, to most of us ticks are only a temporary nuisance, to be removed (usually with difficulty) and destroyed. Ticks are also small, difficult to sample and to identify; therefore, they are rather surprising subjects for a national survey of their distribution and hosts. However, the late Gordon Thompson agreed to collate records for the Biological Records Centre in the 1960s and his collection forms the nucleus of the data summarized in the atlas.

Thanks to the co-operation of colleagues in the Arachnida Section of the Department of Zoology, British Museum (Natural History), Thompson's records, together with those from most of the other principal collections of ticks in British and Irish museums, have now been documented by Kieran Martyn. It has been a lengthy process, but the result, a documentary data base, is now deposited at the Biological Records Centre.

The publication of this atlas is particularly timely because ticks, or at least one species, Ixodes ricinus, have recently been the subject of several medical publications and have also received attention in the popular media. Lyme disease, a tick-borne spirochaete causing a variety of symptoms in humans, especially children, has been recognized in several parts of Britain in recent years. This atlas summarizes the distribution and recorded hosts of all the 'native' species of ticks known to occur in the British Isles. It is to be hoped that the atlas will prove useful not only to biologists interested in the ectoparasites of vertebrates, but also to medical and veterinary colleagues.

It has been a pleasure to work with Kieran Martyn on these data. He has shown great patience, not only in compiling the records, but also during the gestation of this atlas. It is also good to see museum collections, particularly those at the British Museum (Natural History), providing information for a variety of uses. The atlas is only 'provisional', and it may well be some decades before a more definitive publication can be published because ticks will always remain a minority interest group.

Monks Wood Experimental Station
January 1988

Paul T Harding
Biological Records Centre

INTRODUCTION

Some 800 species of ticks, in three families, exist throughout the world. Twenty-three species from two families are found in the British Isles, the majority of which belong to the family Ixodidae, or hard ticks, and in particular to the genus Ixodes. Hard ticks are characterized by the possession of a sclerotized scutal plate on the dorsum and by having terminal mouthparts. The Argasidae or soft ticks, of which only three species have been recorded in the British Isles, do not have this dorsal scutum and have mouthparts positioned ventrally and therefore not visible from above.

There are four stages in the life cycle of a tick: an egg, a six-legged larva, an eight-legged nymph (which in the argasids may have anything up to eight morphologically similar instars), and an eight-legged, adult stage. All mobile stages, except the males of a few species, feed on blood and/or tissue fluids. In some species, the immature stages may feed on a different host species, species group or even phylum to that of the adults; for example, the larvae and nymphs of Haemaphysalis punctata feed on small mammals and birds, while the adults are mainly found on large mammals.

The two families present in Britain differ markedly in certain aspects of their biology. Both have the ability to rapidly increase their body volume when taking in large amounts of blood, but expansion is achieved in different ways. The ixodids lay down new layers of inner cuticle which, on expanding, maintains the normal thickness of the integument. The outer cuticle has fingerprint-like patterns or ridges to allow for this expansion. The argasids, on the other hand, have a leathery cuticle with raised tubercules or mammilae interspersed with deep folds which facilitate expansion.

The method of feeding also differs between the two families. Apart from the larvae, which may remain on the host for several days, argasids feed quickly (30-60 minutes) and, when replete, leave the host to hide. It is this aspect of their biology which associates argasids with birds or bats, both of which tend to return to a roost, and it is here that the ticks lie in wait for the return of their host. The ixodids tend to be more active hunters and go in search of their host. They feed more slowly over a much longer period of time on the host (several days rather than minutes). Because of the higher risk factors involved in locating a host, ixodid mortality is higher than in the argasids, hence egg production is much greater in ixodids. There are, however, exceptions to this generalization. Those Ixodes species that are associated with nests or roosts may behave in a similar way to the argasids in some aspects of their biology, eg I. canisuga.

The main economic significance of ticks is not that they are blood feeders, but that, in the process of feeding, pathogens responsible for diseases may be transmitted to the host. These pathogens include bacteria, viruses, spirochaetes, protozoans and, most importantly, rickettsia. Certain ticks in the British Isles transmit a number of economically important diseases of animals, including redwater fever, louping-ill and tickborne fever. In this country, humans can be mildly affected by louping-ill and recently by the more severe Lyme disease. The spirochaete causing Lyme disease has been isolated from populations of Ixodes ricinus in parts of England (Muhlemann & Wright 1987). The degree of severity of attack varies from a slight rash to symptoms similar to arthritis and, in severe cases, to heart damage or neurological complications, including meningitis.

SOURCES OF RECORDS

The main source of the records for this atlas are the collections housed in the British Museum (Natural History); these include the collections of individuals who dedicated much of their time to the study of ticks. The most notable collections are those of G B Thompson, who first started collating British tick data in the 1960s, G H F Nuttall, S Bennett and A Milne. Other collections include F A Turk, (BM(NH)), the collections of the Hope Museum, Oxford, and some of the collections of the National Museum of Ireland. Unfortunately, the bulk of the latter's collections were on loan to the University of Cork and at the time of collating data for this atlas were not available. Other sources are the personal records of R Knowles (BM(NH)), the the H Britten material at the Manchester Museum and the computer data of the Smithsonian Institute. With the exception of specimens labelled as I. dorriensmithi, I. guernseyensis and I. arvicolae, no re-identification of specimens was undertaken.

Since the publication of British ticks (Arthur 1963), there have been many name changes and some additions to the British fauna. Because of these, and the danger of mis-identification and mis-naming, past literature records have not been used.

PRODUCTION OF DISTRIBUTION MAPS AND ANALYSES OF DATA

Information from specimen data labels was transcribed into the museum register or, for material from sources other than the BM(NH), on to specially designed forms. Copies of all these data have been deposited at the Biological Records Centre.

Wherever possible, records were assigned to 10-km grid squares using the British and Irish national grids. Grid references were derived from the place names given on data labels. Ambiguous names (eg Newport, without a county) were not gridded. All grid references were checked by Paul Harding at BRC and, where necessary, corrected, before the maps were produced. Because the data have not been computerized, all maps were produced by hand by Paul Harding. The occurrence of species is shown on the maps using the 10-km squares of the national grids. The dates of records have not been differentiated on the maps.

The analysis of the hosts recorded for each species is believed to be the first such analysis ever attempted in the British Isles, and it provides a simple numerical statement of the range of hosts used by ticks. The analysis was done by Paul Harding and the author from the data sheets deposited at the Biological Records Centre. Host species are listed using English names in the systematic sequence used by Frazer (1983) for reptiles and amphibians, Peterson et al. (1974) for birds, and Corbet and Southern (1977) for mammals.

CHECKLIST

IXODIDAE

Ixodes acuminatus Neumann 1901
I. dorriensmithi Turk 1948
I. guernseyensis Arthur 1955

Ixodes apronophorus Schulze 1924
I. arvicolae Warburton 1926

Ixodes arboricola Schulze & Schlotte 1929

Ixodes caledonicus Nuttall 1910

Ixodes canisuga Johnston 1849

Ixodes frontalis (Panzer 1805)
I. pari Leach 1815

Ixodes hexagonus Leach 1815

Ixodes lividus C L Koch 1844

Ixodes ricinus (Linnaeus 1758)

Ixodes rothschildi (Nuttall & Warburton 1911)

Ixodes unicavatus Neumann 1908

Ixodes ventalloi Gil Collado 1936
I. festai Rondelli 1926 sensu Arthur 1963

Ixodes vespertilionis C L Koch 1844

Ixodes (Ceratixodes) uriae White 1852

Ixodes (Exopalpiger) trianguliceps Birula 1895

Dermacentor reticulatus (Fabricius 1794)

Hyalomma (Hyalommasta) aegyptium (Linnaeus 1758)*

Hyalomma marginatum marginatum C L Koch 1844

Haemaphysalis punctata Canestrini & Fanzago 1877

Rhipicephalus sanguineus Latreille 1806

ARGASIDAE

Argas refexus (Fabricius 1794)

Argas (Carios) vespertilionis (Latreille 1802)

Ornithodoros (Alectorobius) maritimus (Vermeil & Marguet 1967)
O. capensis Neumann 1901 sensu Arthur 1963

* See appendix

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I would like to thank Dr J O'Connor, National Museum of Ireland, Dr M Scoble, Hope Museum, and Dr J Keirans, Smithsonian Institute, for allowing me access to their collections and data. I would also like to thank Mr R Knowles for providing me with some of the anecdotal information contained in this atlas and also Dr D George for information on Lundy Island. Final thanks must go to Mr D Macfarlane, Ms A Baker and Mr K Hyatt of the British Museum (Natural History) for their help and comments, and lastly Mr P T Harding of the Biological Records Centre for his assistance and encouragement.

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Thompson, G.B. 1963. The parasites of British birds and mammals. XXXIX. The Blyborough tick Argas (Carios) vespertilionis. Entomologist's mon. Mag., **98**, 247-250.

Thompson, G.B. 1964. The parasites of British birds and mammals. XLI. The long-legged bat tick Ixodes vespertilionis Koch 1844. (Ixodoidea). Entomologist's mon. Mag., **100**, 18-20.

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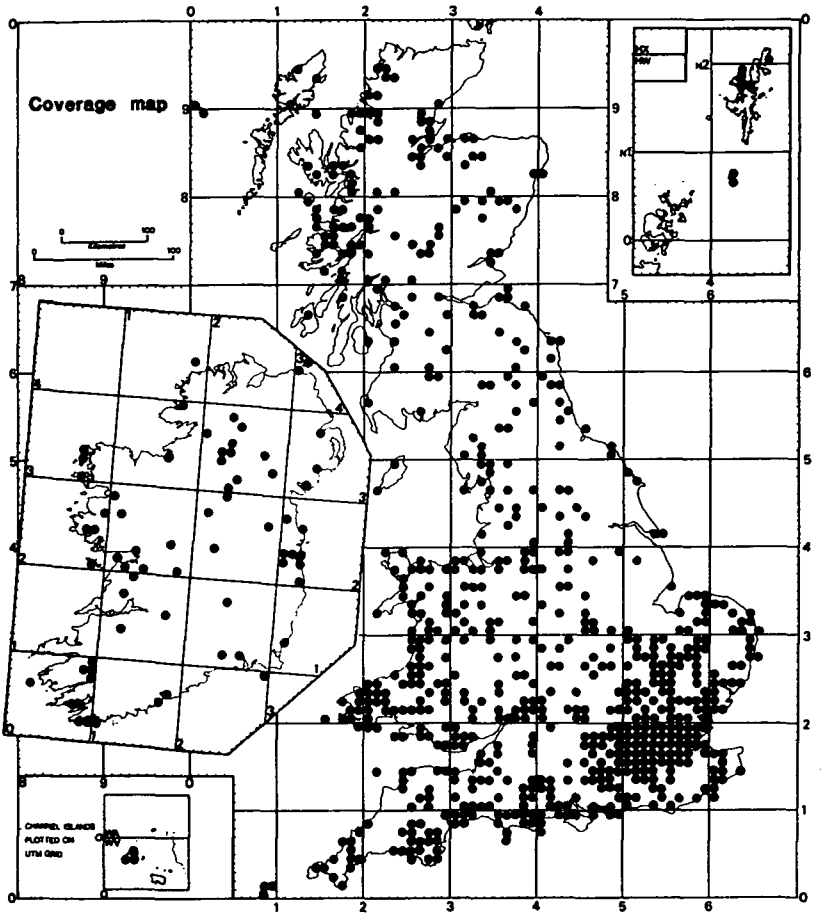
DISTRIBUTION MAPS AND SPECIES ACCOUNTS


Coverage map
CHANNEL ISLANDS
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UTM GRID

Ixodes acuminatus Neumann

Britain probably represents the northern limit of the range of this small mammal parasite. I. dorriensmithi was synonomized with I. apronophorus by Rood and Burt (1965). However, Morel and Perez (1977) believed that it is probably a synonym of I. acuminatus. A study of the hypostomal dentition and coxal chaetotaxy of syntype nymphs and larvae of I. dorriensmithi supports the latter view. The distributions of I. acuminatus and I. apronophorus appear to be separated by a line, running west to east across southern England, and continued across Europe. Little is known of the biology of I. acuminatus.

Total number of records: 14

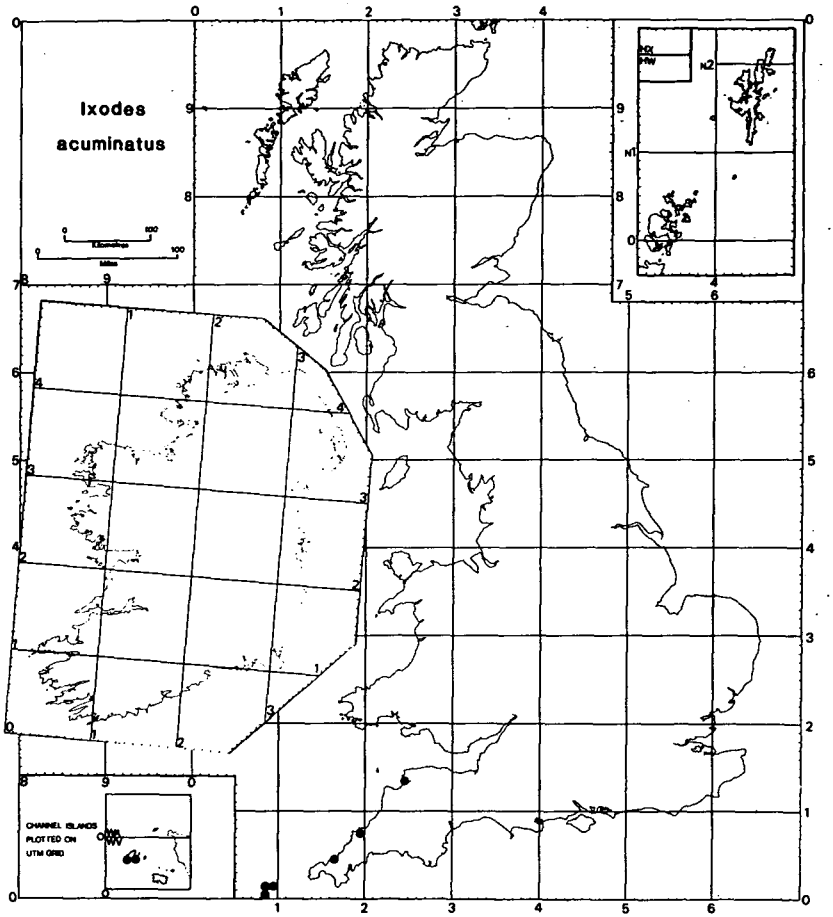
Total number of 10-km squares: 6

Total number of hosts recorded: 7

Total number of records with host recorded: 13

Total number of records with host identified: 13

Species	Number of records
Pygmy shrew	1
Lesser white-toothed shrew	2
Wood mouse	2
Field vole	2
Guernsey vole	1
House mouse	3
Common rat	2


Ixodes
acuminatus
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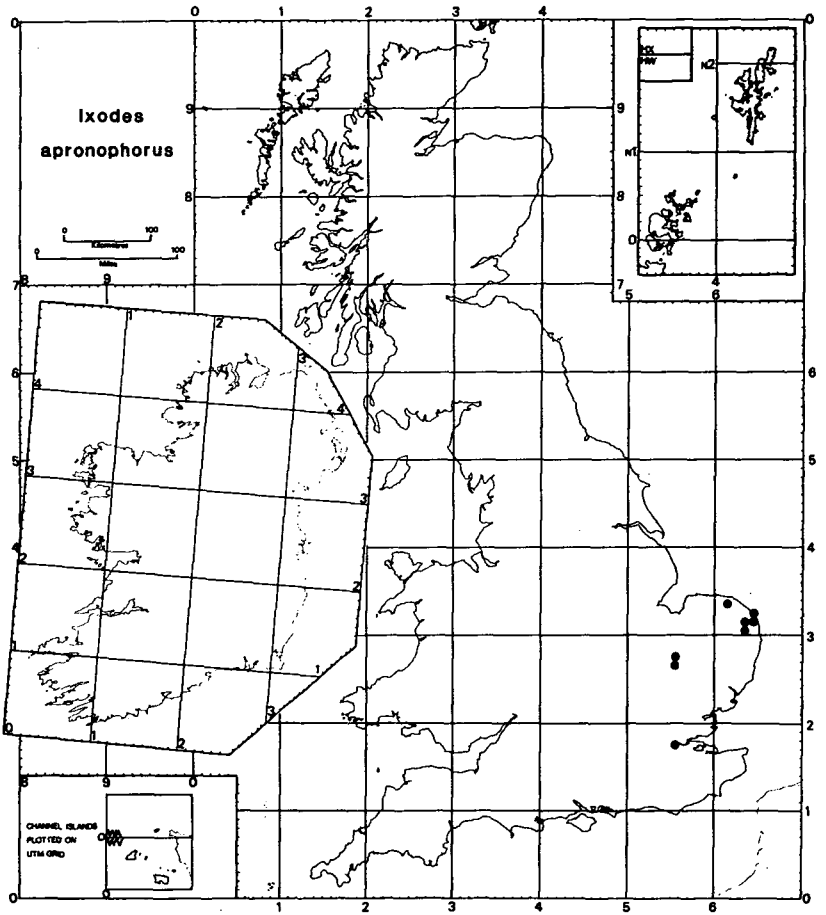
UTM GRID

Ixodes apronophorus Schulze

Although found throughout northern Europe, it is uncommon in Britain (see also I. acuminatus). A parasite of small mammals, it has a pattern of seasonal variations in population levels similar to that of other species of Ixodes which infest mammals in Britain. Tick numbers increase to a maximum in spring, decline in the summer months and peak again in the autumn. The coypu is a recent addition to the British fauna and probably became a host to I. apronophorous because it is found in the same localities and habitats as water voles. The large number of records from coypu is a reflection of the interest in this rodent as a pest of crops and because of the damage caused to riverbanks by its burrowing.

Total number of records:	73
Total number of 10-km squares:	8
Total number of hosts recorded:	8
Total number of records with host recorded:	73
Total number of records with host identified:	73

Species	Number of records
Common shrew	4
Pygmy shrew	1
Bank vole	18
Field vole	4
Water vole	19
Wood mouse	3
Ship rat	1
Coypu	23


Ixodes
apronophorus
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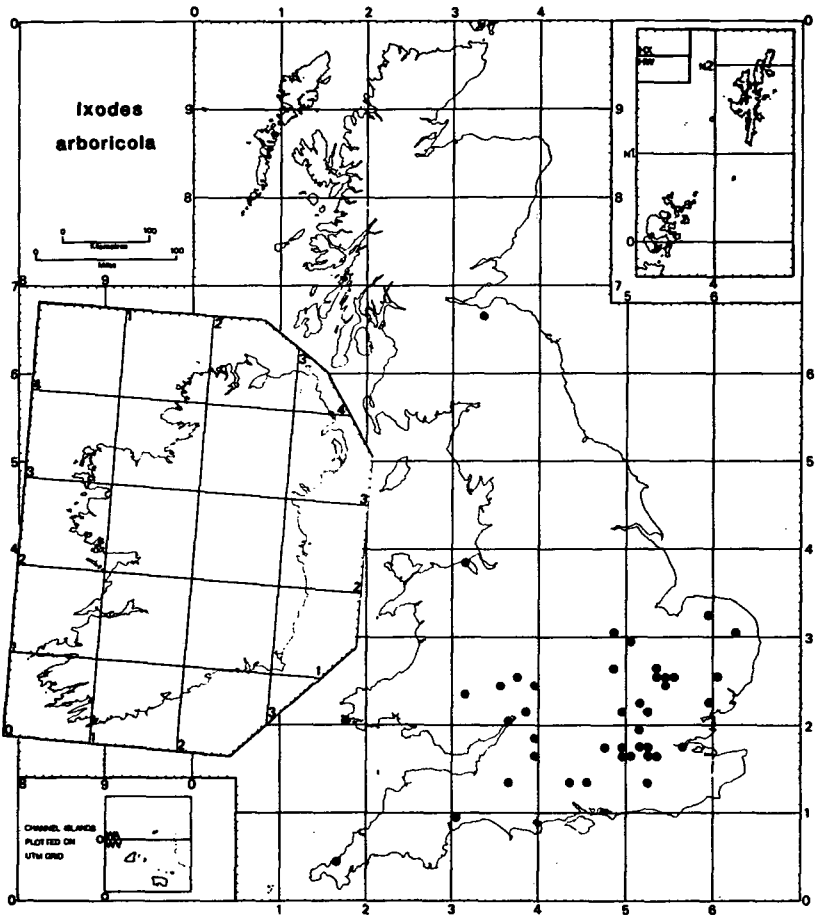
Ixodes arboricola Schulze & Schlotte

Limited to northern Europe, this species is primarily a parasite of birds in all its stages. The most common hosts are tits and warblers, but any bird, or noctule bat, that nests or roosts in tree cavities may be parasitized. Like many bird ticks, it is found in small numbers on the host, usually around the head, and out of pecking range. Males are found in and around the nest, but rarely on the host. In some localities, it is found together with I. frontalis. The two species, however, appear to mature at different times of the year. Adults of I. arboricola are most numerous from December to March, while I. frontalis adults are most common from October to December.

Total number of records:	227
Total number of 10-km squares:	42
Total number of hosts recorded:	21
Total number of records with host recorded:	224
Total number of records with host identified:	221

Species	Number of records
Barn owl	5
Little owl	4
'Owl'	1
Sand martin	1
Wren	1
Reed warbler	1
Willow warbler	1
Pied flycatcher	1
Robin	2
Blackbird	1
Marsh tit	1
Willow tit	1
Coal tit	1
Blue tit	77
Great tit	105
'Tit'	1
Nuthatch	7
Bullfinch	1
House sparrow	2
Tree sparrow	3
'Sparrow'	1
Starling	4
Jackdaw	1
Noctule	1


Ixodes
arboricola
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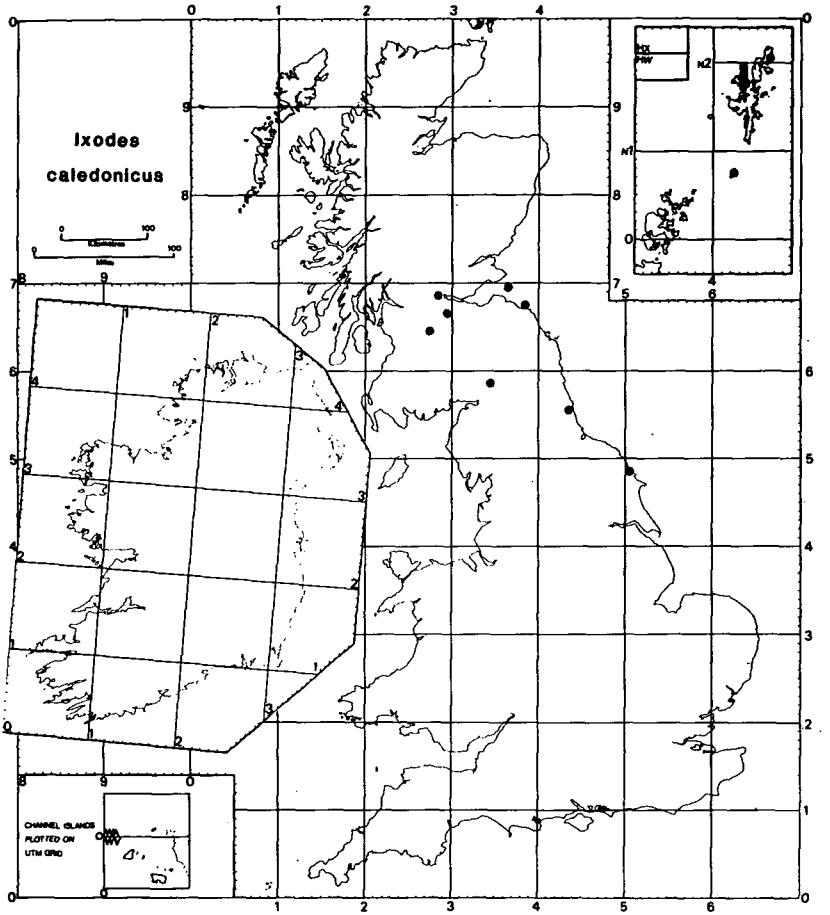
Ixodes caledonicus Nuttall

This species was first described from Britain, but has since been recorded in Germany, Russia and Norway. It is solely a parasite of birds, attacking a variety of species. The biology of this tick is poorly known.

Total number of records:	28
Total number of 10-km squares:	13
Total number of hosts recorded:	11
Total number of records with host recorded:	28
Total number of records with host identified:	17

Species	Number of records
Fulmar	1
Gyr falcon	1
Kestrel	1
'Hawk'	1
'Pigeon/dovecot'	10
Redstart	1
Crossbill	1
Starling	4
Jackdaw	2
Hooded crow	5
Raven	1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Ixodes canisuga Johnston

The dog tick

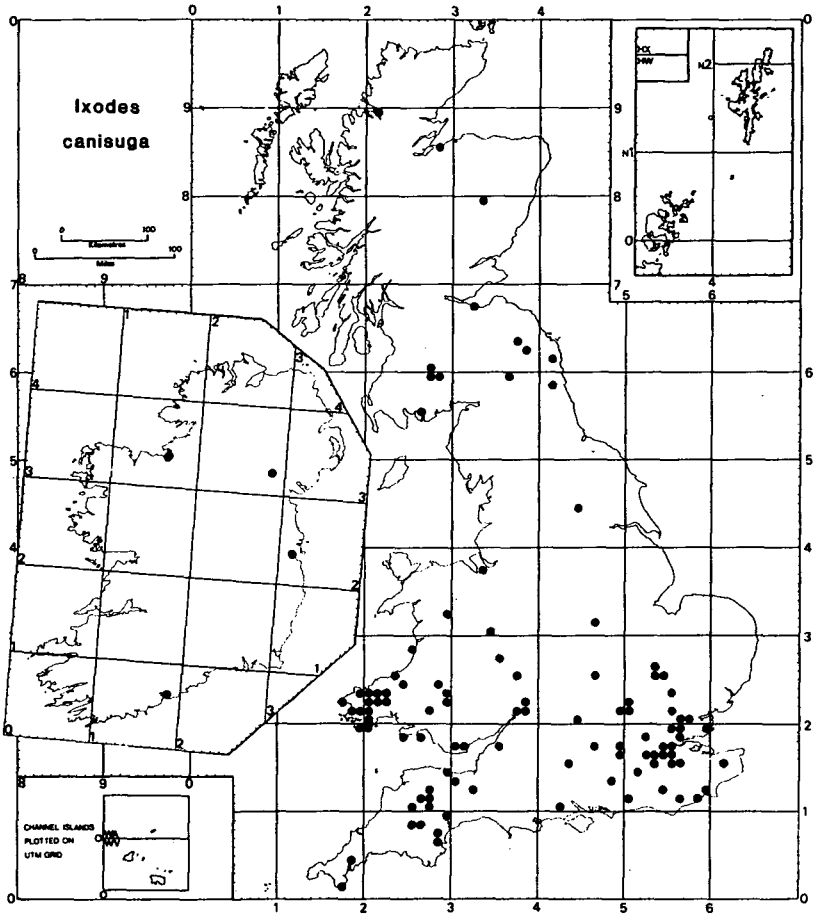
Found over most of the western Palaearctic, all stages of this species usually parasitize large mammals which regularly return to a nest or lair, those most frequently attacked being dog, fox and badger. Most, if not all, records from birds should be regarded with caution as they are probably mis-identifications of I. lividus and I. hexagonus.

I. canisuga has a relatively thick cuticle and so, unlike I. ricinus, which also parasitizes large mammals, it can withstand the drier conditions found in kennels, badger setts, etc. The cuticle thickness, however, reduces the potential for body expansion during feeding, so that feeding periods tend to be shorter and egg production lower than in I. ricinus.

I. canisuga is alleged to be a vector of Pasteurella pestis (plague) in Russia (Arthur 1963).

Total number of records:	177
Total number of 10-km squares:	105
Total number of hosts recorded:	14
Total number of records with host recorded:	172
Total number of records with host identified:	172

Species	Number of records
Sand martin	2
Blue tit	1
Great tit	1
Tree sparrow	1
Starling	1
Dog	39
Fox	65
Pine marten	1
Ferret	4
Mink	21
Badger	33
Horse	1
Muntjac	1
Sheep	1


Ixodes
canisuga
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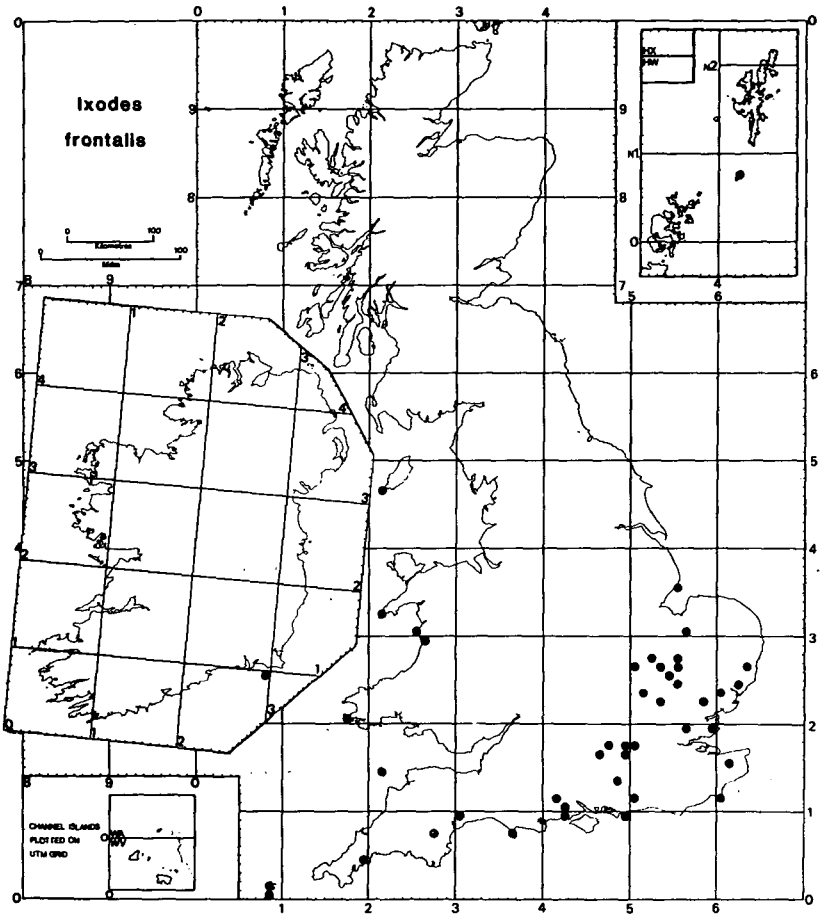
Ixodes frontalis (Panzer)

Widely distributed through Europe, it is a parasite only of birds, mainly small passerines. Males have not yet been found in Britain, but elsewhere have been reported from undergrowth beneath trees used by nesting hosts. Its period of peak activity is from October to December (cf I. arboricola).

Total number of records:	150
Total number of 10-km squares:	44
Total number of hosts recorded:	31
Total number of records with host recorded:	150
Total number of records with host identified:	148

Species	Number of records
Water rail	1
'Owl'	1
Tree pipit	2
Pied wagtail	1
Wren	4
Barrel warbler	1
Blackcap	2
Whitethroat	9
Willow warbler	6
Chiffchaff	6
Goldcrest	1
Robin	3
Ring ouzel	1
Blackbird	38
Redwing	2
Song thrush	8
Long-tailed tit	1
Marsh tit	1
Willow tit	1
Coal tit	2
Blue tit	10
Great tit	7
Treecreeper	1
Chaffinch	5
Greenfinch	14
Linnet	2
Redpoll	1
Bullfinch	3
'Exotic finch'	1
House sparrow	10
Tree sparrow	3
Jay	1
Rook	1


Ixodes
frontalis
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Kilometres
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Miles
CHANNEL ISLANDS
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Ixodes hexagonus Leach

The hedgehog tick

A common and widely distributed species found throughout Europe. It has a wide range of mammalian hosts, and birds are occasionally parasitized. In World War II, it was a commonly reported parasite of humans when both humans and hedgehogs took refuge in Anderson shelters. I. hexagonus has spring and autumn population peaks (cf I. apronophorus).

I. hexagonus can be distinguished from the other common species, I. ricinus, by the more angled shape of the female scutum and by the presence of terminal humps on tarsi I.

The bite of this species is known to cause much irritation, malaise and possibly ulceration in humans (Arthur 1963).

Total number of records: 717

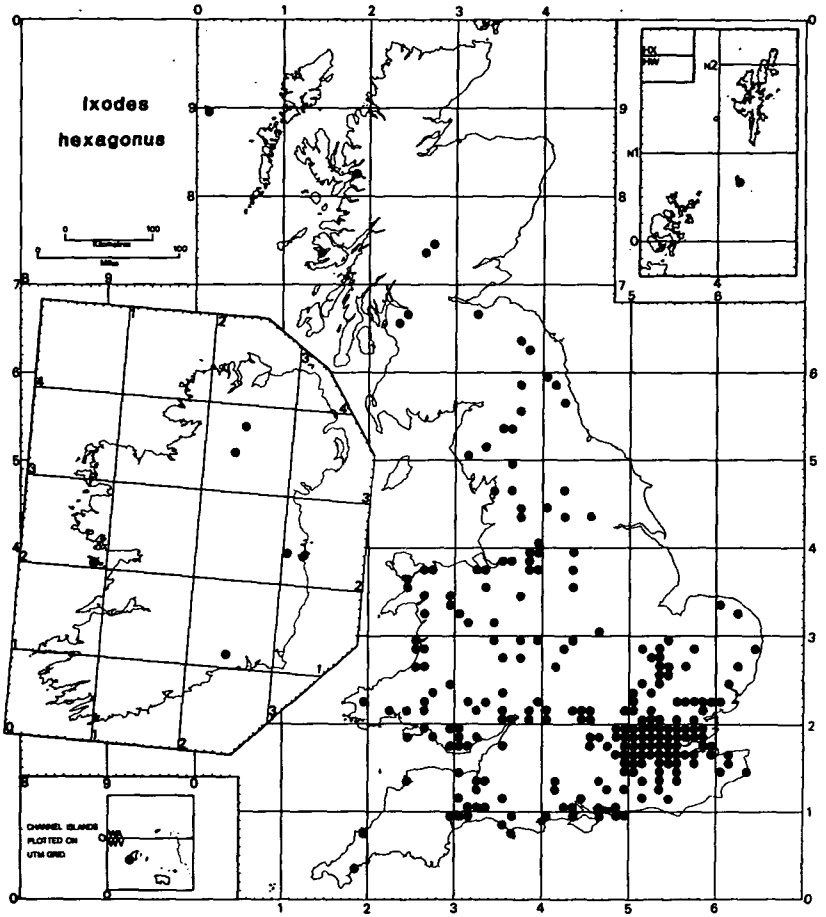
Total number of 10-km squares: 247

Total number of hosts recorded: 28

Total number of records with host recorded: 649

Total number of records with host identified: 649

Species	Number of records	Species	Number of records
Kestrel	1	Domestic and zoo animals	82
Wren	1	Dog	43
Blue tit	2	Cat	32
Starling	1	Horse	2
Hedgehog	174	Oryx	1
Mole	1	Cow	1
Common shrew	4	Sheep	2
Pygmy shrew	1	Monkey	1
Rabbit	3		
Red squirrel	1	Vegetation, etc	9
Grey squirrel	1		
Wood mouse	2		
'Rat'	2		
Fox	140		
Stoat	60		
Weasel	21		
Polecat	42		
Ferret	16		
Mink	14		
Badger	20		
Otter	70		
Humans	50		
Buildings	29		


Ixodes
hexagonus
CHANNEL ISLANDS
PLOTTED ON
UTM GRID

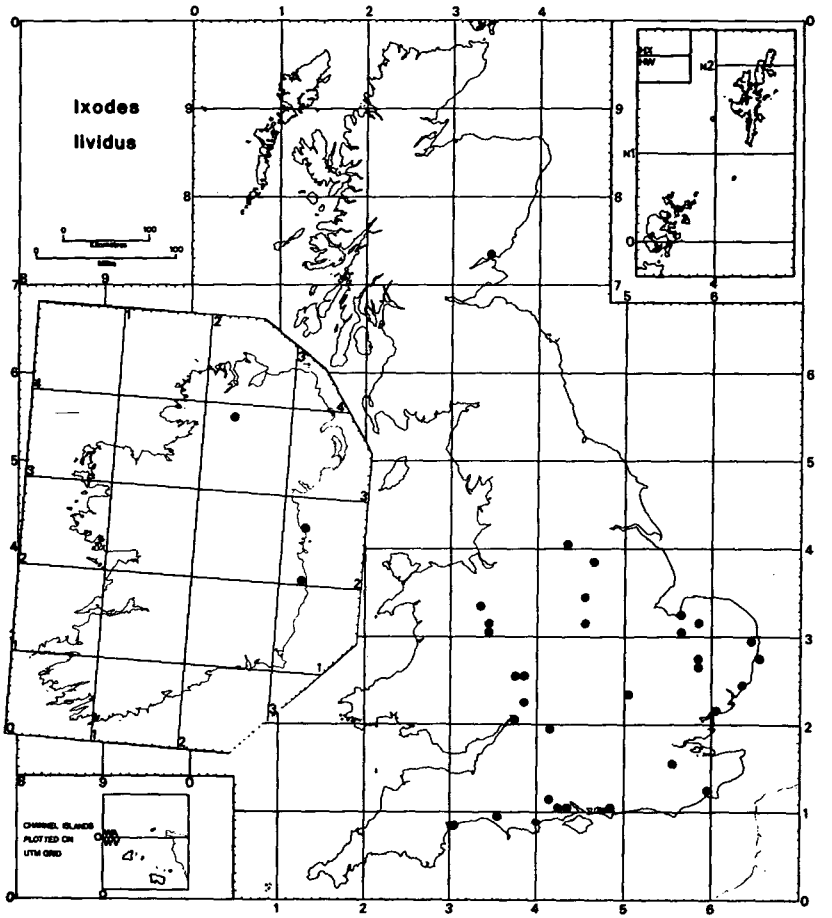
Ixodes lividus C L Koch

The sand martin tick

Found over much of Europe, in Britain it is a parasite exclusively of sand martins and its distribution reflects that of suitable host nesting sites. Males are only found in nests and probably do not feed. Larvae are assumed to overwinter in the burrows until the sand martins return in late spring. I. lividus resembles I. canisuga, but the different host associations make them easily distinguishable. Rather surprisingly, I. lividus is recorded as a vector of spring-summer encephalitis in northern Russia (Sheals 1973).

Total number of records:	68
Total number of 10-km squares:	34
Total number of hosts recorded:	2
Total number of records with host recorded:	68
Total number of records with host identified:	67

Species	Number of records
Sand martin	67
Redstart?	1


Ixodes
lividus
CHANNEL ISLANDS
PLOTTED ON
UTM GRID

Ixodes ricinus (Linnaeus)

The castor bean, sheep or pasture tick

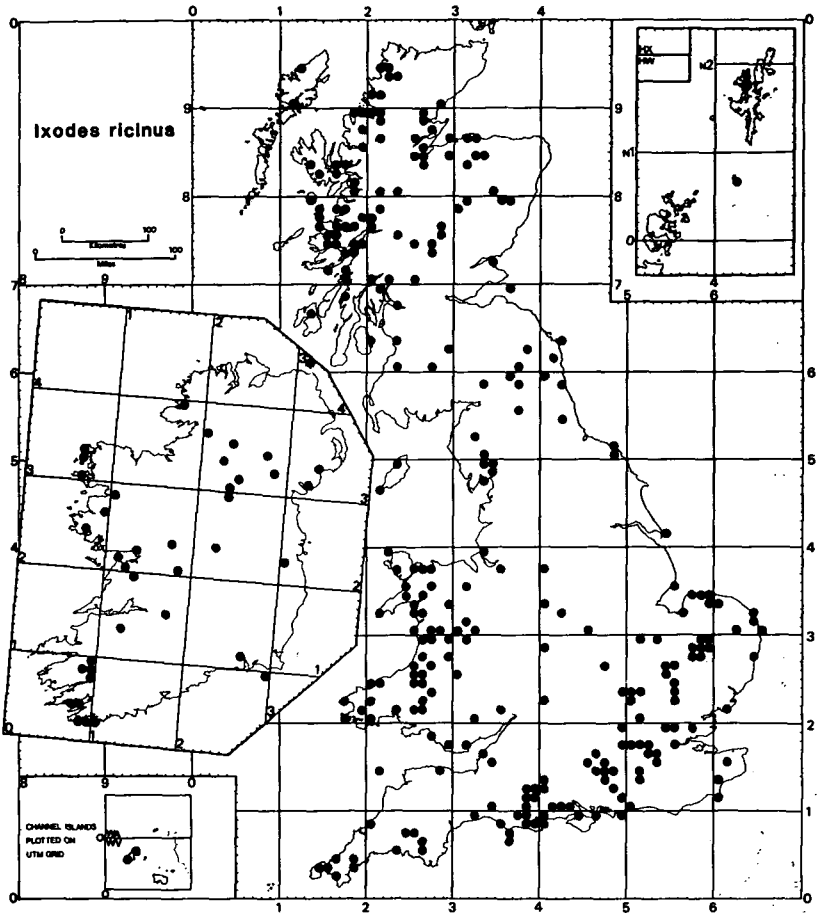
This is our commonest species of tick and is widespread over much of the Palaearctic. Adult females, nymphs and larvae commonly parasitize medium- to large-sized mammals. Larvae and nymphs are also found on small mammals, birds and reptiles, while adult males rarely attach to the hosts.

I. ricinus requires a high humidity to survive and is commonly found in rough, undrained grazing land, where decaying vegetation forms a mat, under which the humidity may reach the desired levels.

I. ricinus is known to transmit louping-ill, a virus of sheep (Arthur 1963), redwater fever of cattle (Arthur 1963), and also Lyme disease which affects humans (Williams et al. 1986; Muhlemann & Wright 1987; Parke 1987). It also carries tickborne fever of sheep, cattle, goats and deer.

Total number of records:	1344
Total number of 10-km squares:	316
Total number of hosts recorded:	85
Total number of records with host recorded:	1255
Total number of records with host identified:	1205

Species	Number of records
Sand lizard	5
Common lizard	1
'Lizard'	3
Sparrowhawk	1
Red grouse	5
Quail	1
Pheasant	3
Crane	1
Lapwing	1
Curlew	1
Woodcock	1
Long-eared owl	2
Skylark	7
House martin	1
Tree pipit	4
Pechora pipit	1
Meadow pipit	46
Pied wagtail	3
Wren	6
Dunnock	11
Grasshopper warbler	1
Sedge warbler	8
Reed warbler	2
Blackcap	2


Ixodes ricinus
CHANNEL ISLANDS
PLOTTED ON
UTM GRID

I. ricinus (continued)

Species	Number of records
Whitethroat	77
Willow warbler	124
Chiffchaff	5
Pied flycatcher	4
Spotted flycatcher	3
Whinchat	3
Stonechat	3
Wheatear	4
Pied wheatear	1
Redstart	13
Robin	31
Fieldfare	2
Ring ouzel	4
Blackbird	143
Redwing	18
Song thrush	7
Mistle thrush	1
Coal tit	2
Blue tit	5
Great tit	1
Siskin	1
Linnet	7
Redpoll	3
Crossbill	1
Bullfinch	1
Starling	5
Magpie	4
Carrion crow	1
Exotic birds	4
Hedgehog	3
Mole	3
Common shrew	37
Pygmy shrew	5
Water shrew	2
Rabbit	34
Brown hare	2
Mountain hare	4
'Hare'	6
Red squirrel	21
Grey squirrel	3
'Squirrel'	2
Field vole	24
Wood mouse	16
Apodemus sp	29
Common rat	2
'Rat'	3
Coypu	23
Fox	10
Stoat	1
Polecat	1
Ferret	1
Otter	1

I. ricinus (continued)

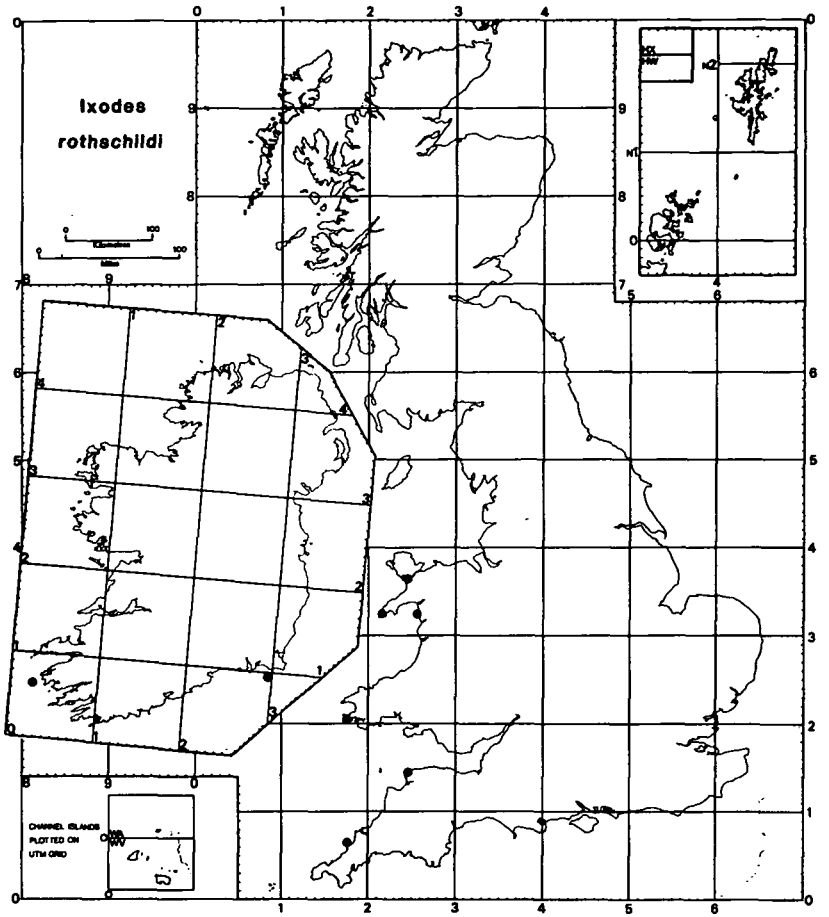
Species	Number of records
Wild cat	2
Red deer	20
Sika deer	19
Roe deer	91
Muntjac	15
Water deer	2
Feral goat	1
Feral sheep	2
Humans	50
Houses and buildings	7
'Small mammals'	3
Dog	65
Cat	12
Horse	2
Oryx	1
'Deer'	19
Bison	1
Cattle	89
Goat	2
Sheep	31

Ixodes rothschildi (Nuttall & Warburton)

This species is only known from the coasts and islands of England, Ireland, Wales and France. It is a parasite of seabirds and is active between April and July. The males have poorly developed hypostomes and are not known to feed. Infestations can be heavy and birds have been known to die from severe blood loss (exsanguination) caused by this species.

Total number of records:	42
Total number of 10-km squares:	9
Total number of hosts recorded:	5
Total number of records with host recorded:	42
Total number of records with host identified:	42

Species	Number of records
Manx shearwater	1
Shag	1
Herring gull	5
Guillemot	1
Puffin	34

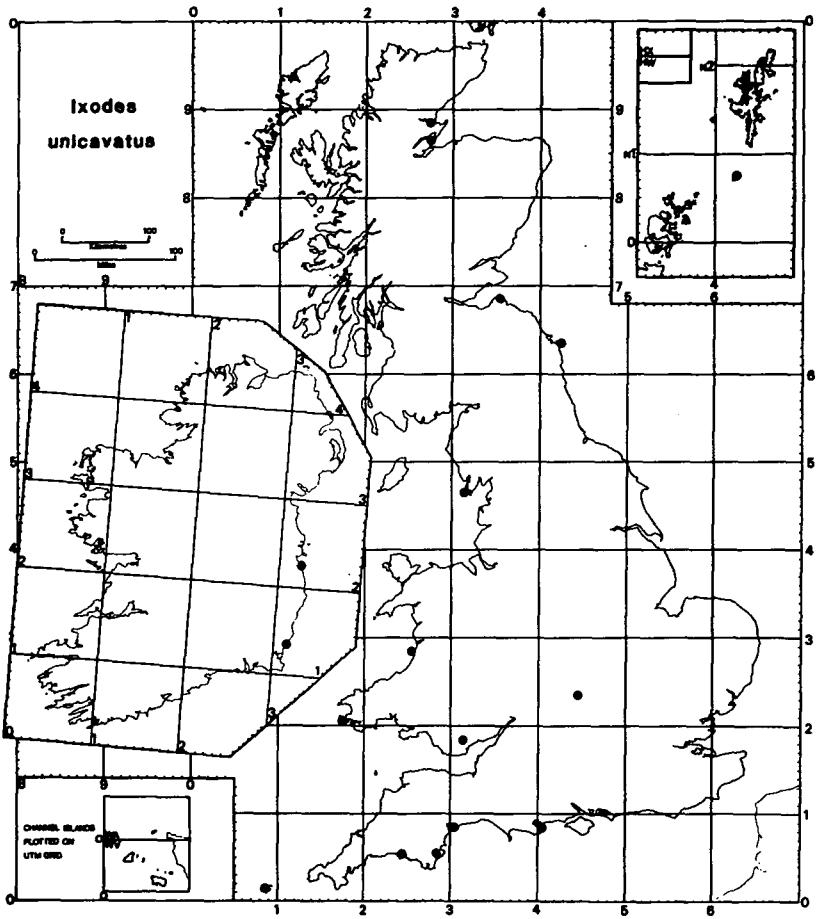

Ixodes
rothschildi
CHANNEL ISLANDS
PLOTTED ON
UTM GRID

Ixodes unicavatus Neumann

Like I. rothschildi, the distribution of this species is restricted to north-west Europe, but, in addition to the countries where I. rothschildi has been found, I. unicavatus has also been recorded in Sweden. It usually parasitizes marine and coastal birds. The anomalous record from the centre of southern England is from a migrating rock pipit. The female can easily be identified by the single porose area which runs the full width of the basis capituli. The biology of this species is poorly known.

Total number of records:	24
Total number of 10-km squares:	20
Total number of hosts recorded:	5
Total number of records with host recorded:	23
Total number of records with host identified:	23

Species	Number of records
Cormorant	11
Shag	8
Gyr falcon	1
Puffin	1
Rock pipit	2


Ixodes
unicavatus
CHANNEL ISLANDS
PLOTTED ON
UTM GRID

Ixodes ventalloi Gil Collado

The rabbit tick

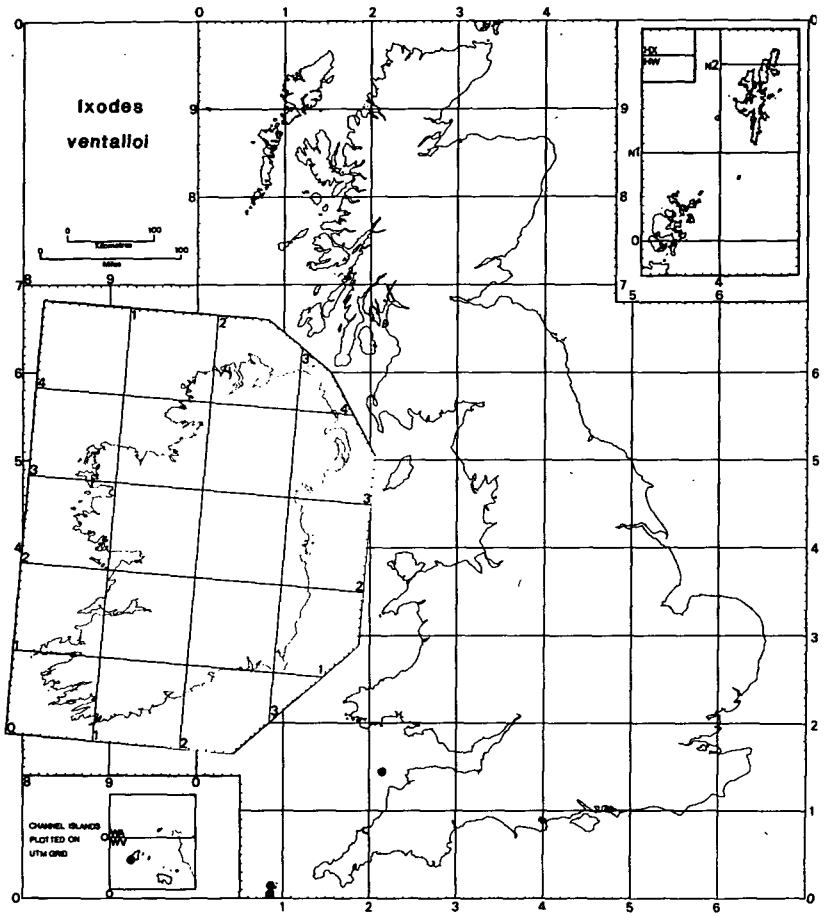
Principally an Iberian species, I. ventalloi has also spread to France, West Germany and north Africa. It is rare in Britain, and has so far only been found on the Channel Islands, Lundy Island and the Scilly Isles, where it was probably introduced with rabbits that were farmed commercially. The earliest records of rabbits in Britain refer to skins exported from Lundy in 1274 (Sheail 1971).

The synonymy of I. ventalloi with I. festai has been challenged by Morel and Perez (1977) who state that I. ventalloi is host specific to rabbits. Predators of rabbits may become parasitized, eg the British records of this species from cats and a long-eared owl.

The males are found on the hosts, have well-developed mouthparts, and probably feed. I. ventalloi can be easily recognized by the presence of retrograde auriculae in the female.

Total number of records:	13
Total number of 10-km squares:	4
Total number of hosts recorded:	3
Total number of records with host recorded:	13
Total number of records with host identified:	13

Species	Number of records
Long-eared owl	1
Rabbit	4
Cat	8


Ixodes
ventalloi
CHANNEL ISLANDS
PLOTTED ON
UTM GRID

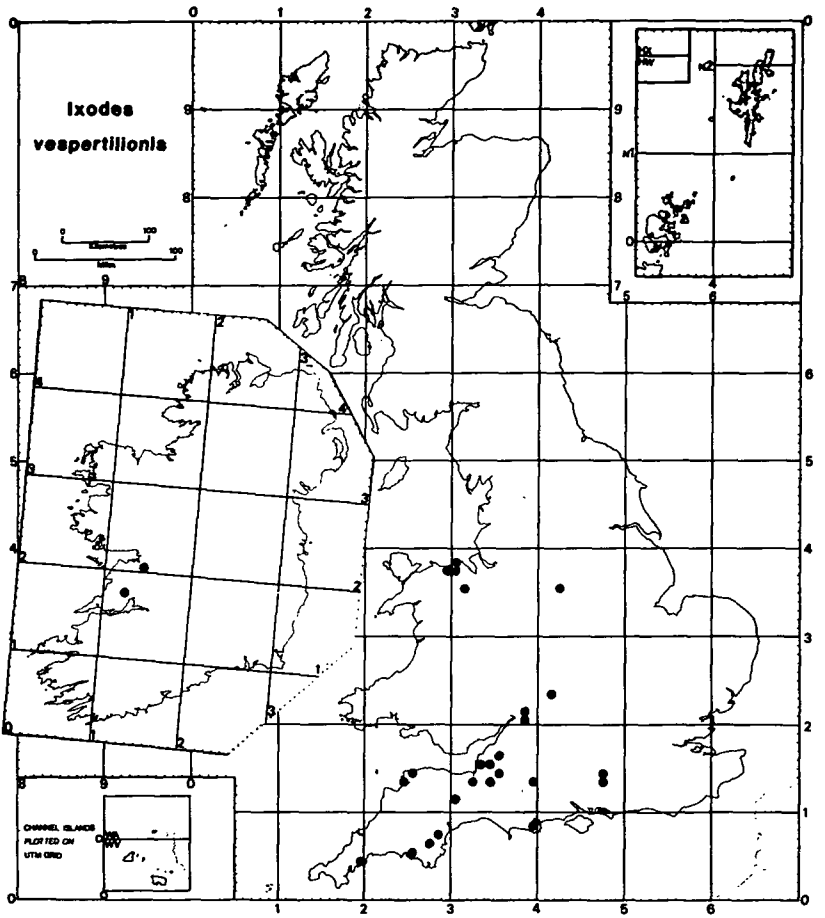
Ixodes vespertilionis C L Koch

The long-legged bat tick

Widely distributed across the whole of the Palaearctic, it has entered Australia with its bat hosts. Except for the single record of I. arboricola, this is the only ixodid tick recorded from bats in Britain. Its preferred hosts are bats of the genus Rhinolophus (horseshoe bats) whereas the other bat tick (Argas vespertilionis) has only once been recorded from this genus. The males do not feed and are found in crevices and on the walls of roosts. Apart from the host association, they can be recognized by their extremely long legs.

Total number of records:	80
Total number of 10-km squares:	27
Total number of hosts recorded:	4
Total number of records with host recorded:	59
Total number of records with host identified:	53

Species	Number of records
Greater horseshoe bat	17
Lesser horseshoe bat	33
'Horseshoe bat'	2
Whiskered bat	2
Serotine	1
'Bats'	4


Ixodes
vespertilionis
CHANNEL ISLANDS
PLOTTED ON
UTM GRID

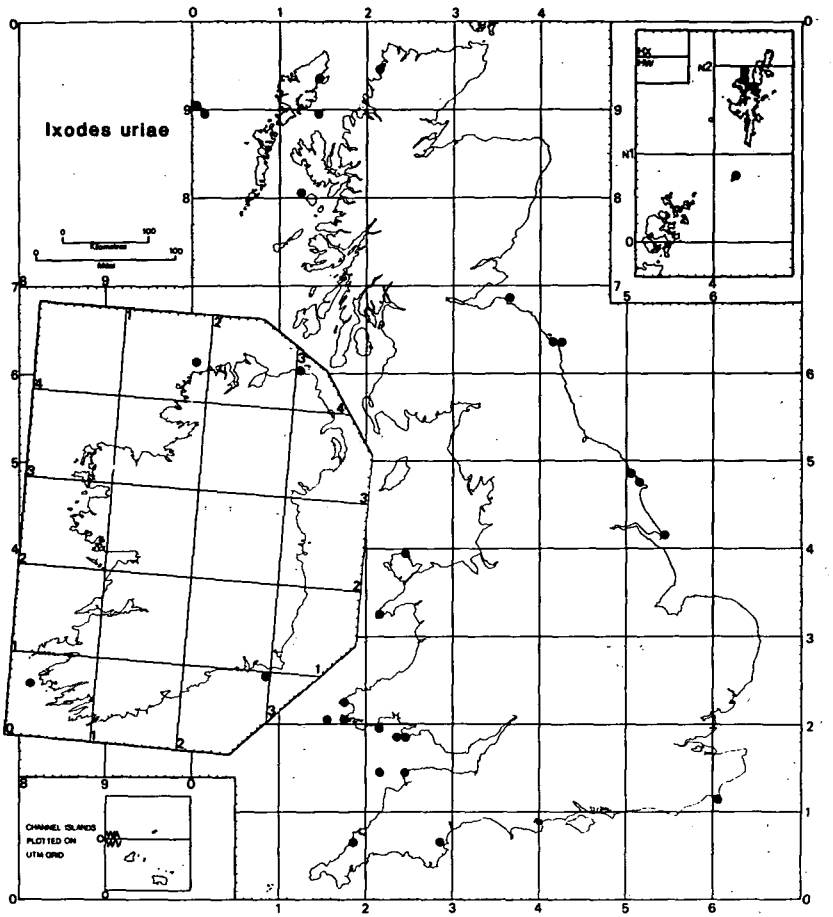
Ixodes (Ceratixodes) uriae White

The seabird tick

This species has a bipolar distribution, and in both its northern and southern distributions it is circumpolar. It is a parasite of marine birds. Males and females are often found in copula under stones and in the tufts of vegetation near the nesting site. Males have a characteristic brush along the posterior margin of the body formed by five tufts of setae. Heavy infestations may result in death of the host due to exsanguination. This species is known to attack humans giving an extremely painful bite (Arthur 1963).

Total number of records:	125
Total number of 10-km squares:	33
Total number of hosts recorded:	14
Total number of records with host recorded:	103
Total number of records with host identified:	100

Species	Number of records
Fulmar	5
Gannet	5
Shag	2
Curlew	1
Herring gull	1
Kittiwake	6
'Gull'	3
Razorbill	11
Guillemot	24
Black guillemot	2
Puffin	29
Wheatear	1
Starling	1
Crossbill	1
Humans	11


Ixodes uriae
CHANNEL ISLANDS
PLOTTED ON
UTM GRID

Ixodes (Exopalpiger) trianguliceps Birula

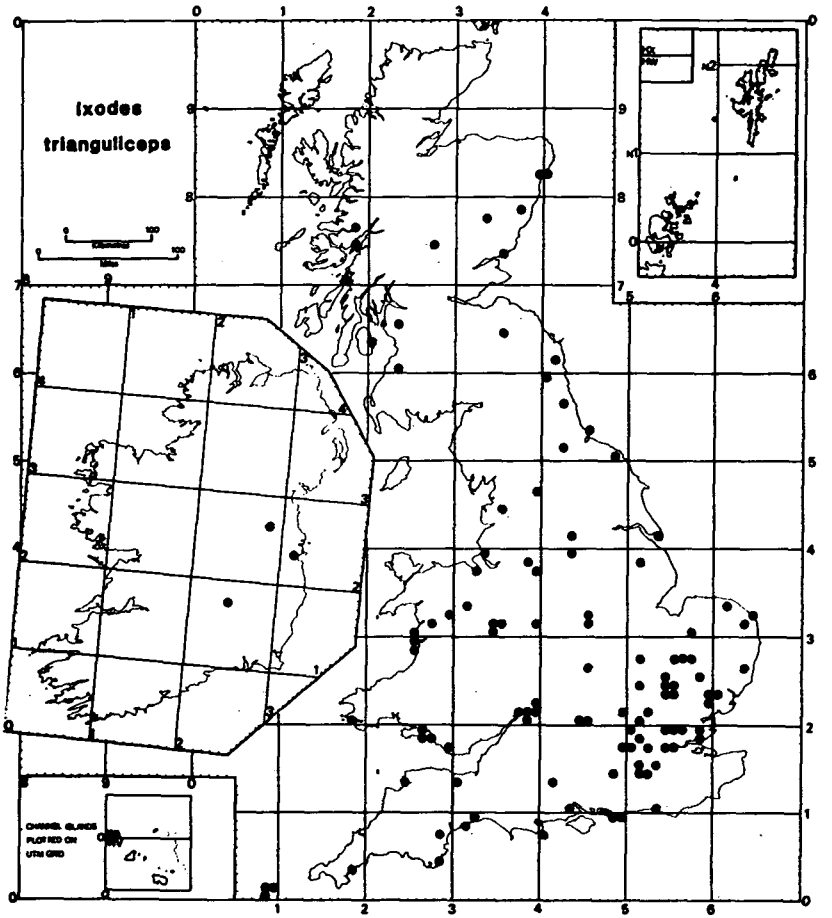
The vole or shrew tick

Widely distributed over much of Europe, this species is common in Britain, but relatively scarce in Ireland where it is replaced principally by I. ricinus. I. (E.) trianguliceps is exclusively a parasite of small, burrowing mammals. Males are found on the host and this behaviour is believed to safeguard them against being trapped in the host's shallow burrow systems which are liable to flooding or collapse. I. (E.) trianguliceps secretes a fluid which causes cytolysis of cartilage, and is often found attached to the ear of its host. Peak activity is from May to July.

This species can be recognized by the presence of flanges on coxae I and II in females and nymphs and on coxae 1-IV in males. In Russia, it is thought to be a vector of spring-summer encephalitis (Arthur 1963).

Total number of records:	276
Total number of 10-km squares:	112
Total number of hosts recorded:	16
Total number of records with host recorded:	263
Total number of records with host identified:	245

Species	Number of records
Hedgehog	2
Mole	3
Common shrew	43
Pygmy shrew	20
Water shrew	1
Lesser white-toothed shrew	2
Rabbit	2
Grey squirrel	2
Bank vole	57
Field vole	32
Water vole	19
Wood mouse	50
Yellow-necked mouse	1
Harvest mouse	4
Common rat	6
Miscellaneous unidentified small mammals	18
Small mammal nests	6
Human	1


Ixodes
trianguliceps

Dermacentor reticulatus (Fabricius)

The marsh tick

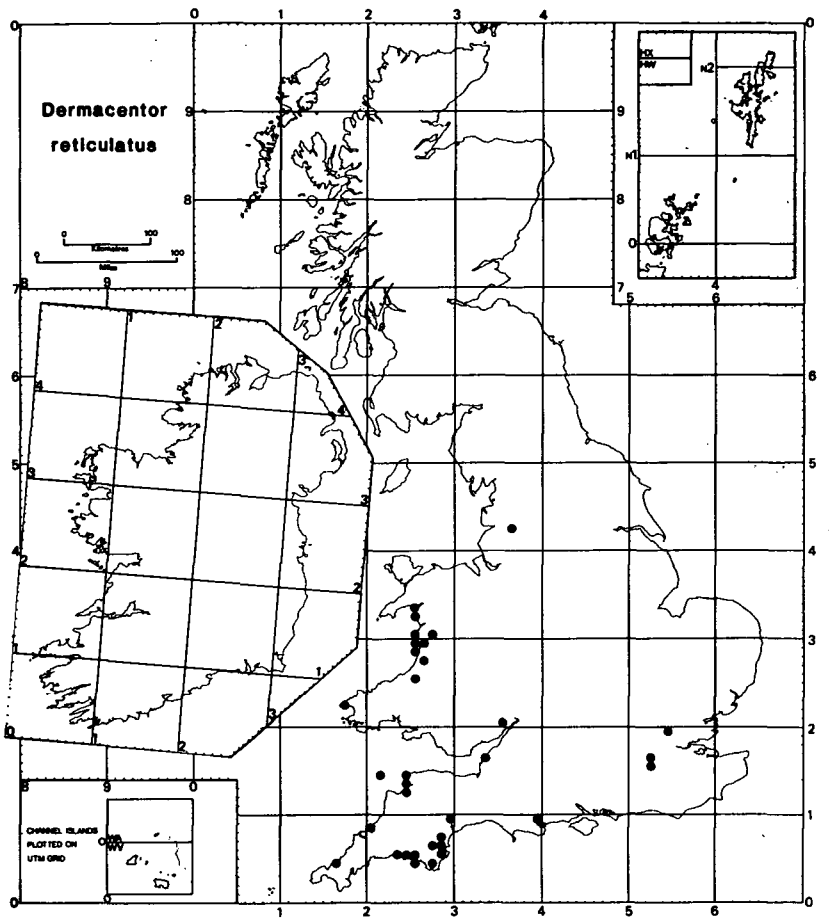
Widely distributed throughout Europe, the distribution in Britain is patchy and is believed to be a reflection of ancient droving practices (see also H. punctata). The principal hosts of the adults are large domestic mammals, but they have also been known to parasitize humans and dogs. The peak period of activity is March to June.

D. reticulatus can be distinguished from the other British species by its conspicuously ornate scutal shield.

D. reticulatus is known to cause redwater fever of cattle, and to transmit the protozoans Nuttallia equi and Piroplasma caballi of horses and P. canis of dogs. It can also transmit the virus causing infectious encephalomyelitis of horses and tularemia of rodents (Arthur 1963).

Total number of records:	67
Total number of 10-km squares:	33
Total number of hosts recorded:	5
Total number of records with host recorded:	42
Total number of records with host identified:	41

Species	Number of records
Human	16
Dog	18
Sheep	4
Cattle	3
Vole (Microtus sp.)	1


Dermacentor
reticulatus
CHANNEL ISLANDS
PLOTTED ON
UTM GRID

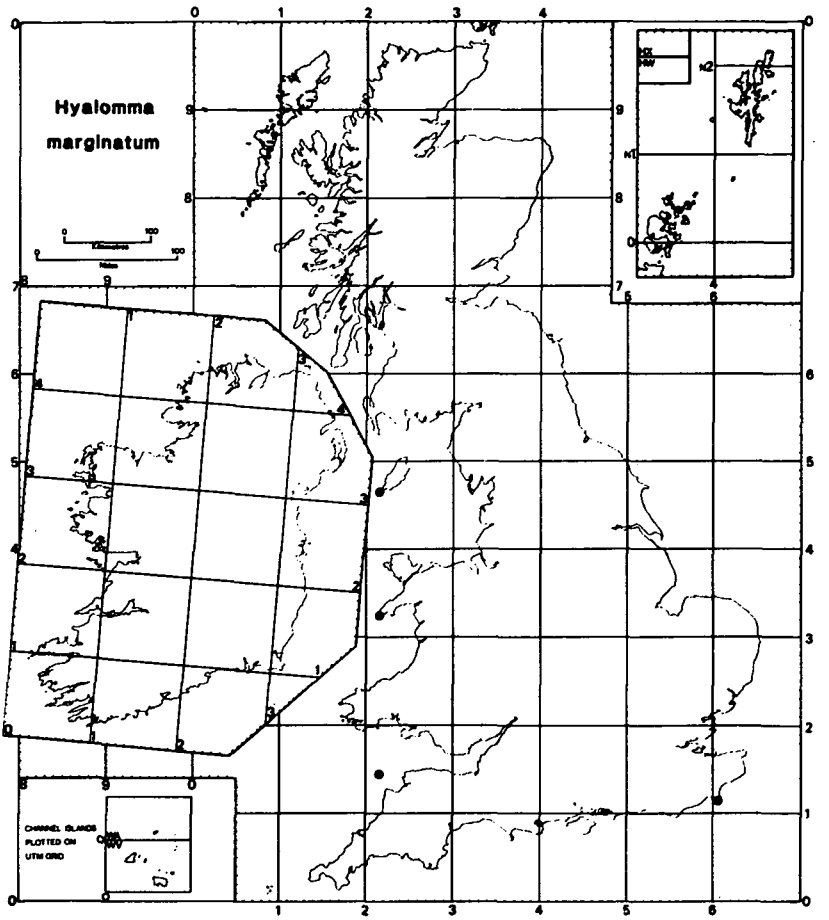
Hyalomma marginatum marginatum C L Koch

Found throughout most of the Palaearctic region, in Britain all records refer to larvae and nymphs that have been collected from newly arrived migrant birds at island and coastal localities. Birds returning to Britain from central Africa probably pick up the ticks while stopping over in Iberia or north Africa.

Adults are parasitic on large mammals and have so far not been recorded in Britain, probably because this sub-species, like the birds that bring them, cannot survive the British winters.

Total number of records:	8
Total number of 10-km squares:	4
Total number of hosts recorded:	5
Total number of records with host recorded:	8
Total number of records with host identified:	8

Species	Number of records
Sedge warbler	1
Whitethroat	2
Whinchat	2
Wheatear	1
Redstart	2


Hyalomma
marginatum
CHANNEL ISLANDS
PLOTTED ON
UTM GRID

Haemaphysalis punctata Canestrini & Fanzago

The coastal red tick

Found throughout the Palaearctic, H. punctata has a patchy distribution in Britain similar to that of D. reticulatus. It has been suggested that this distribution reflects ancient droving practices. Welsh sheep and cattle were driven to south-east England to be fattened, many on the marshlands of Kent and Essex, and slaughtered for the London market (Bonser 1970). Both H. punctata and D. reticulatus are at their northern limits and probably only survive in the coastal regions of the droving route because of the milder climate. The marshland habitats of these two species are rapidly being drained and their distributions may become even more restricted. The main hosts of the adults are sheep and cattle - while the immature stages of the life cycle are more often found on passerines.

H. punctata is thought to cause tick paralysis in sheep and humans and to transmit the causitive agents of tickborne rickettsial typhus and redwater fever of cattle.

Total number of records: 82

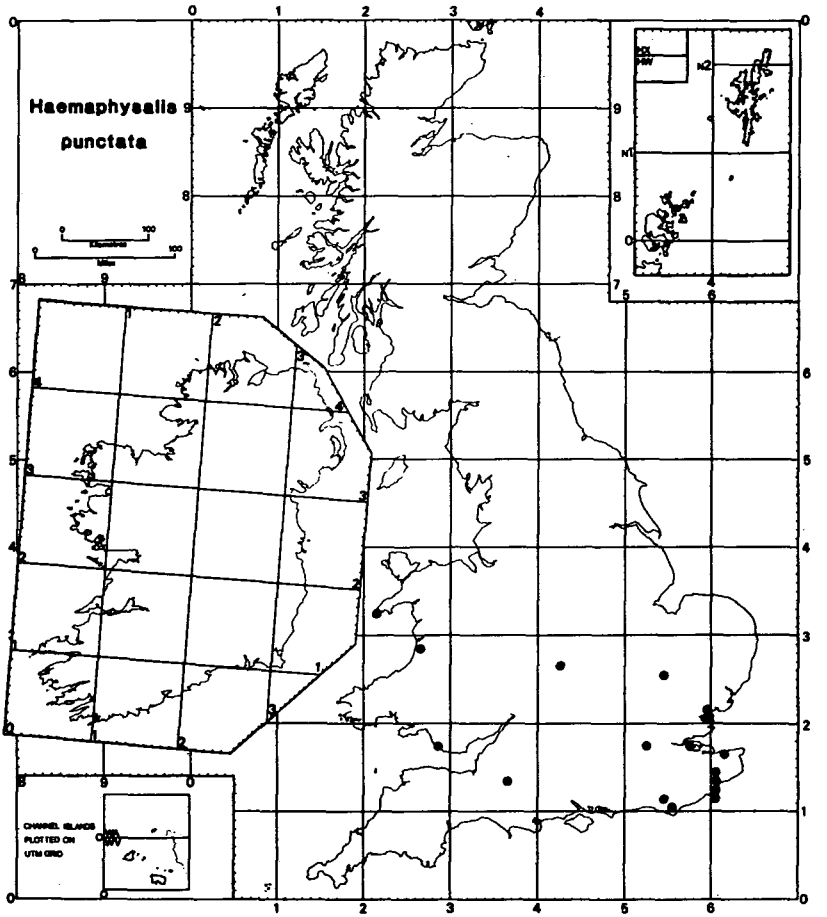
Total number of 10-km squares: 17

Total number of hosts recorded: 29

Total number of records with host recorded: 69

Total number of records with host identified: 69

Species	Number of records	Species	Number of records
Kestrel	1	Hedgehog	1
Herring gull	1	Rabbit	3
Black-headed gull	1	Dog	1
Common tern	1	Hen	3
Skylark	2	Sheep	14
Meadow pipit	1	Cattle	2
Pied wagtail	2		
Dunnock	1	In grass	3
Melodius warbler	1	In house	1
Whitethroat	1		
Willow warbler	2		
Stonechat	3		
Wheatear	5		
Robin	1		
Blackbird	4		
Song thrush	1		
Mistle thrush	1		
Yellowhammer	2		
Reed bunting	1		
House sparrow	1		
Starling	1		
Chough	3		
Jackdaw	1		


Haemaphysalis
punctata
CHANNEL ISLANDS
PLOTTED ON
UTM GRID

Rhipicephalus sanguineus Latreille

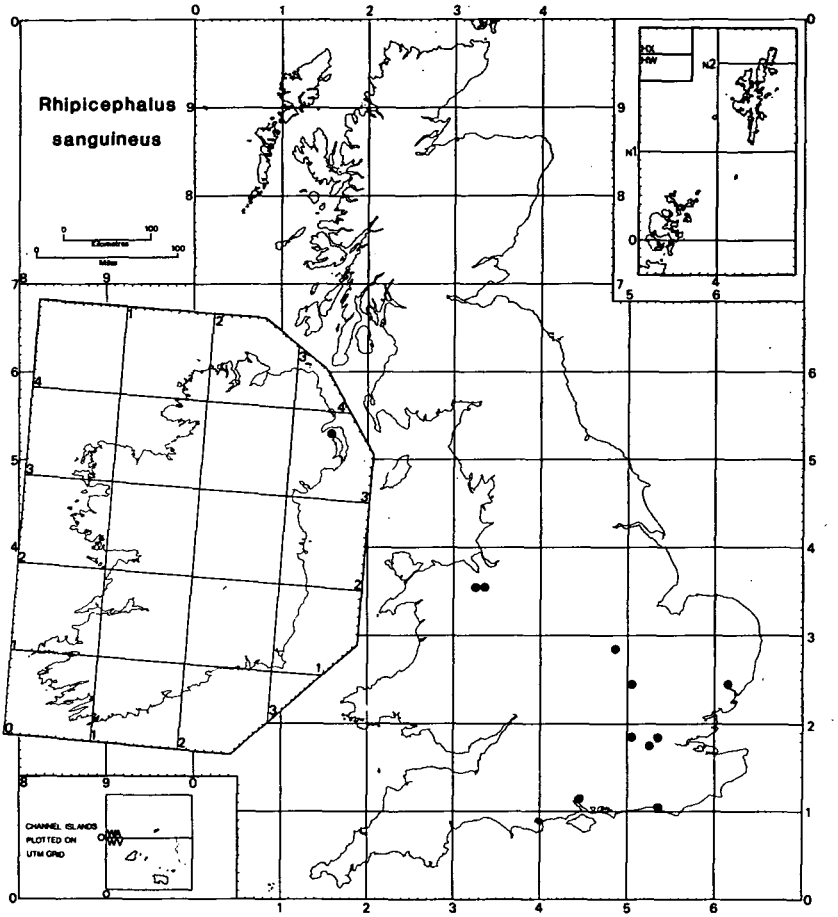
The kennel tick or the brown dog tick

Probably the most widely distributed tick species, it is thought to have originated in Africa and to have spread to nearly every country between latitudes 50N and 35S. In Africa, a wide range of mammals is parasitized, but in Britain it is principally a parasite of the domestic dog. The climate in northern Europe is probably too harsh for this species to overwinter out of doors, but, because of its association with the domestic dog, localized populations can become established in kennels, houses, etc.

Elsewhere R. sanguineus is a vector of several diseases of humans, dogs and other domestic mammals (Fain et al. 1981), but they have never been recorded from Britain.

Total number of records:	16
Total number of 10-km squares:	11
Total number of hosts recorded:	3
Total number of records with host recorded:	12
Total number of records with host identified:	12

Species	Number of records
Ostrich	1
Dog	9
Human	2
In house/in furniture	4


Rhipicephalus
sanguineus
CHANNEL ISLANDS
PLOTTED ON
UTM GRID

Argas reflexus (Fabricius)

The Canterbury or pigeon tick

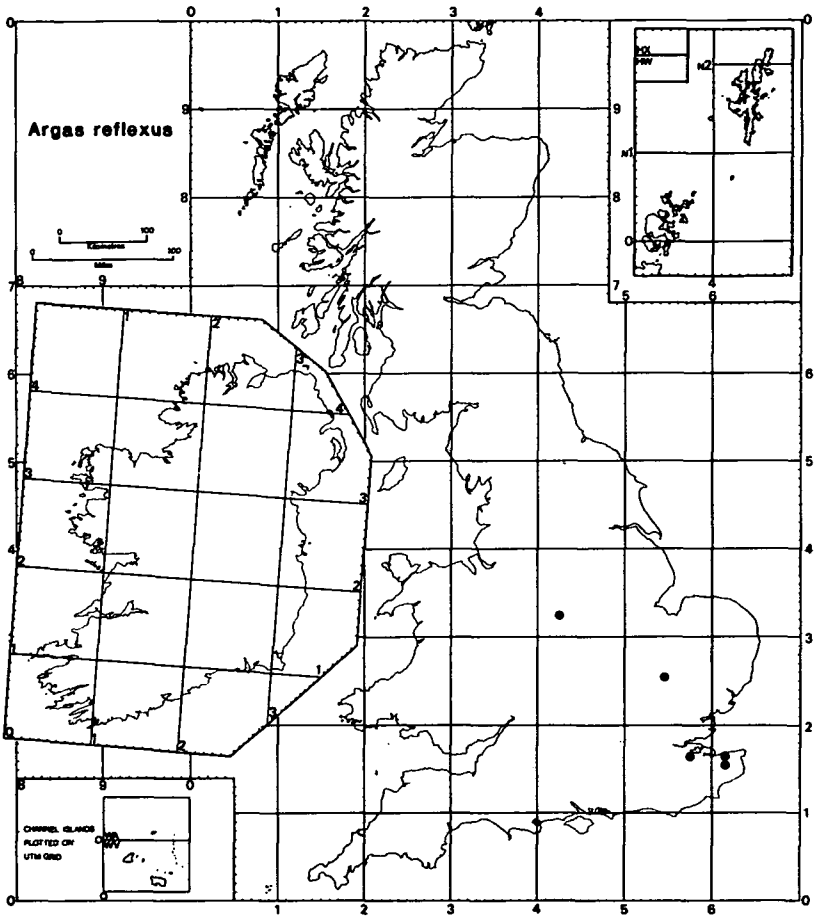
Distributed throughout the Palaearctic, this tick appears to be found where pigeons have nested for many years (Thompson 1962), although, so far, it has only been recorded from Canterbury cathedral, Rochester Castle, Kings College, Cambridge, Herne Bay and Tutbery. It has been suggested (Thompson 1962) that this species originated in the Middle East and dispersed with the domestic pigeon.

Unlike the 'hard ticks' (Ixodidae), the soft argasids feed rapidly and tend, therefore, to be less frequently encountered on the hosts. A. reflexus hides in crevices during the day and feeds at night when the birds return to roost. Once fed, they can survive for long periods without a meal. Males are thought to feed only once a year.

This tick transmits fowl spirochaetosis and fowl piroplasmosis (Arthur 1963). Humans can also be attacked, the wounds being very painful, and often persisting for several years (Arthur 1963).

Total number of records:	13
Total number of 10-km squares:	5
Total number of hosts recorded:	4
Total number of records with host recorded:	5
Total number of records with host identified:	3

Species	Number of records
'Pigeons'	2
House sparrow	1
Jackdaw	1
Cat	1
In building	3


Argas reflexus

Argas vespertilionis (Latreille)

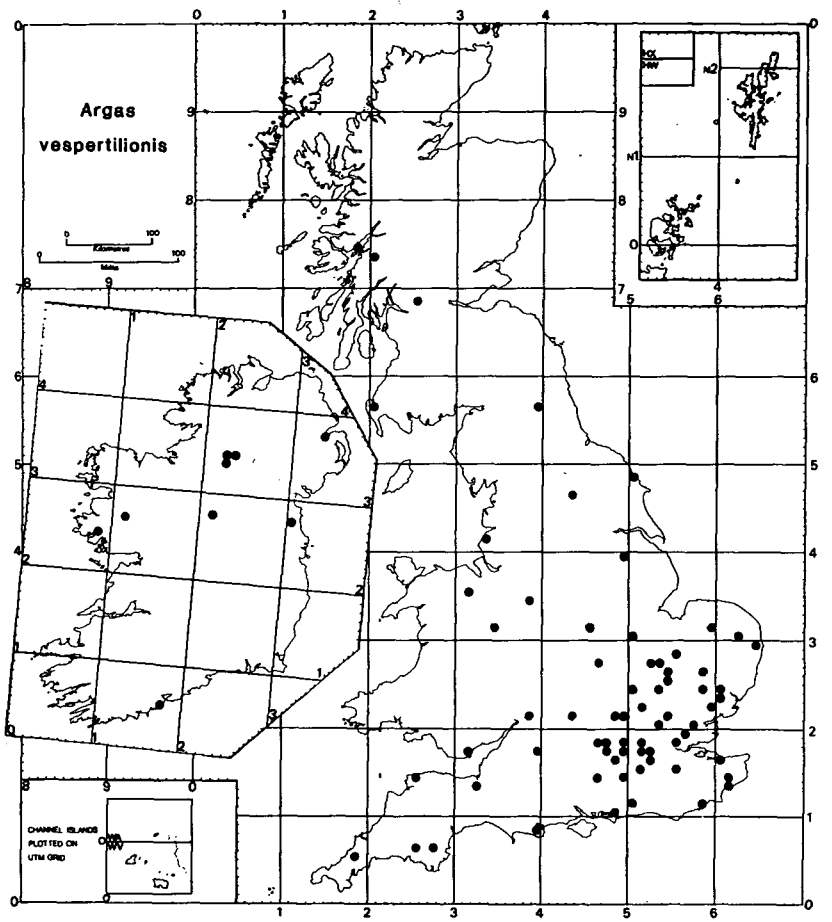
The Blyborough tick

Occurring throughout Europe and Africa, this species is parasitic on bats, especially pipistrelles. Attacks on humans have been recorded.

It is called the Blyborough tick because of the large numbers that were found when the old roof of Blyborough village church, Lincolnshire, was removed in the 1870s (Thompson 1963).

Total number of records:	120
Total number of 10-km squares:	78
Total number of hosts recorded:	6
Total number of records with host recorded:	105
Total number of records with host identified:	93

Species	Number of records
Greater horseshoe bat	1
Whiskered bat	4
Serotine	4
Leisler's bat	1
Pipistrelle	73
Common long-eared bat	10
'Long-eared bat'	2
'Bats/Bat roost'	10


Argas
vespertilionis
CHANNEL ISLANDS
PLOTTED ON
UTM GRID

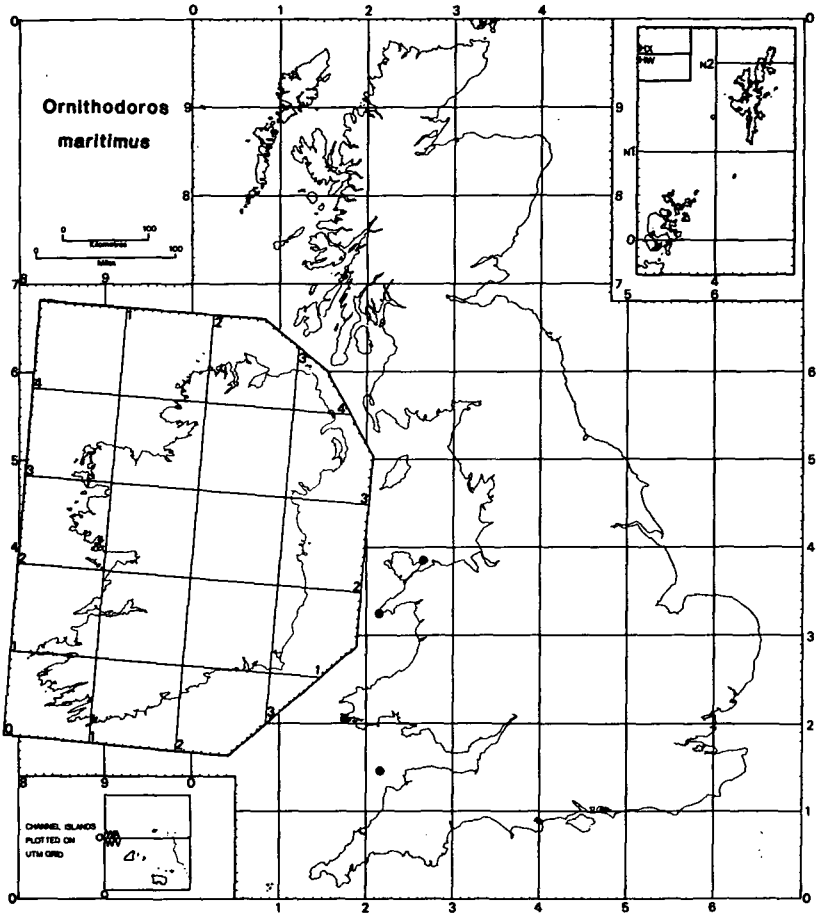
Ornithodoros maritimus (Vermeil & Marguet)

Found in Europe, Tunisia and Dunet Island (Atlantic Ocean), this species was first recorded from Britain in 1954 as O. capensis. A parasite of seabirds, all stages are found on chicks, in the hosts' nests, and under rocks near to the nest.

Soldado virus has been isolated from this species (Hoogstraal et al. 1976).

Total number of records:	18
Total number of 10-km squares:	4
Total number of hosts recorded:	2
Total number of records with host recorded:	9
Total number of records with host identified:	9

Species	Number of records
Shag	6
Razorbill	3


Ornithodoros
maritimus
CHANNEL ISLANDS
PLOTTED ON
UTM GRID

APPENDIX

Hyalomma (Hyalommasta) aegyptium (Linnaeus)

The tortoise tick

This species occurs naturally on tortoises and other reptiles in dry desert areas of the Palaearctic and Ethiopian regions. It was imported into Britain on tortoises destined for the pet trade, and its British distribution will, therefore, reflect this fact. There are no records of established populations of this tick in Britain and the species is unlikely to survive the winter months. With the ban on the importation of living tortoises, it could now be absent from Britain, but this brief account has been included in the atlas because of past records.

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